

WHAT IS CLAIMED IS:

1. A surface emitting laser comprising:
a semiconductor substrate; and
an active layer made on a first major surface of said semiconductor substrate, so that light output from said active layer be obtained in a direction substantially normal to said major surface of said substrate,
said active layer having side surfaces which are offset from vertical planes normal to said major surface of said semiconductor substrate to prevent in-plane horizontal resonance of light in said active layer.
2. The surface emitting laser according to claim 1 further comprising:
a first optical reflector interposed between said semiconductor substrate and said active layer; and
a second optical reflector provided on a superstrate side of said active layer,
all side surfaces of said active layer being offset from vertical planes normal to said major surface.
3. The surface emitting laser according to claim 1 wherein said semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure,
said first major surface of said semiconductor substrate having a surface orientation parallel to the {100} plane,
said side surfaces of said active layer having a surface orientation parallel to the {111} plane.
4. The surface emitting laser according to claim 1 wherein said semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure,
said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than 3° from the {100} plane,
said side surfaces of said active layer having a surface

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orientation parallel to the {011} plane.

5. The surface emitting laser according to claim 4 wherein said side surface of said active layer are made by cleavage.

6. The surface emitting laser according to claim 1 wherein an anti-reflection a dielectric thin film is coated onto said side surface of said active layer.

7. The surface emitting laser according to claim 1 further comprising:

a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction,

facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said substrate.

8. The surface emitting laser according to claim 7 wherein said semiconductor substrate, said active layer and said waveguide layer are made of semiconductors having a zinc blend structured crystalline structure,

said first major surface of said semiconductor substrate having a surface orientation parallel to the {100} plane,

said facets of said active layer and said faces of said waveguide layer having a surface orientation parallel to the {111} plane.

9. The surface emitting laser according to claim 7 wherein said semiconductor substrate, said active layer and said waveguide layer are made of semiconductors having a zinc blend structured crystalline structure,

said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than 3° from the {100} plane,

said facets of said active layer and said faces of said waveguide layer having a surface orientation parallel to the {011} plane.

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10. The surface emitting laser according to claim 9 wherein said facets of said active layer and said facets of said waveguide layer are made by cleavage.

11. The surface emitting laser according to claim 7 further comprising:

a cladding layer provided on said waveguide layer; and
an electrode provided on said cladding layer,
said cladding layer being selectively made in a central part of said laser to form a ridge stripe,
said electrode being electrically connected above said ridge stripe but electrically insulated near facets at opposite ends of said ridge stripe.

12. The surface emitting laser according to claim 11 wherein said semiconductor substrate, said active layer and said waveguide layer are made of semiconductors having a zinc blend structured crystalline structure,

said first major surface of said semiconductor substrate having a surface orientation parallel to the {100} plane,

said facets of said active layer and said facets of said waveguide layer having a surface orientation parallel to the {111} plane.

13. The surface emitting laser according to claim 11 wherein said semiconductor substrate, said active layer and said waveguide layer are made of semiconductors having a zinc blend structured crystalline structure,

said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than 3° from the {100} plane,

said facets of said active layer and said faces of said waveguide layer having a surface orientation parallel to the {011} plane.

14. The surface emitting laser according to claim 13 wherein said facets of said active layer and said facets of said waveguide layer are made by cleavage.

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15. The surface emitting laser according to claim 7 wherein said 2nd-order gratings have a asymmetric cross-sectional configuration.

16. The surface emitting laser according to claim 7 wherein an anti-reflection coating of a dielectric thin film is applied onto said facets of said active layer.

17. A surface emitting laser comprising:

a semiconductor substrate;

an active layer provided on a first major surface of said semiconductor substrate; and

a waveguide layer provided on said first major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, so as to obtain output light in a direction substantially normal to said first major surface of said semiconductor substrate,

said laser having a substantially rectangular element configuration when viewed from a direction normal to said first major surface of said semiconductor substrate,

any of side surfaces of said substantially rectangular element being cleaved surfaces;

said cleaved surfaces being offset from vertical planes normal to said first major surface,

said waveguide direction being not parallel with any of sides of the substantial rectangle.

18. The surface emitting laser according to claim 17 wherein said waveguide direction being offset by an angle other than 45° from any of the sides of the substantial rectangle.

19. The surface emitting laser according to claim 17 wherein said 2nd-order gratings have a asymmetric cross-sectional configuration.

20. A semiconductor light emitting device comprising:

a supporting member;

a surface emitting laser mounted on said supporting member;

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and

a packaging member enveloping said surface emitting laser,
said surface emitting laser including:

a semiconductor substrate; and

an active layer made on a first major surface of said semiconductor substrate, so that light output from said active layer be obtained in a direction substantially normal to said major surface of said substrate,

said active layer having side surfaces which are offset from vertical planes relative to said major surface of said semiconductor substrate to prevent in-plane resonance of light in said active layer.

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